

# NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

January 4, 2011

# Precipitation and Snowpack

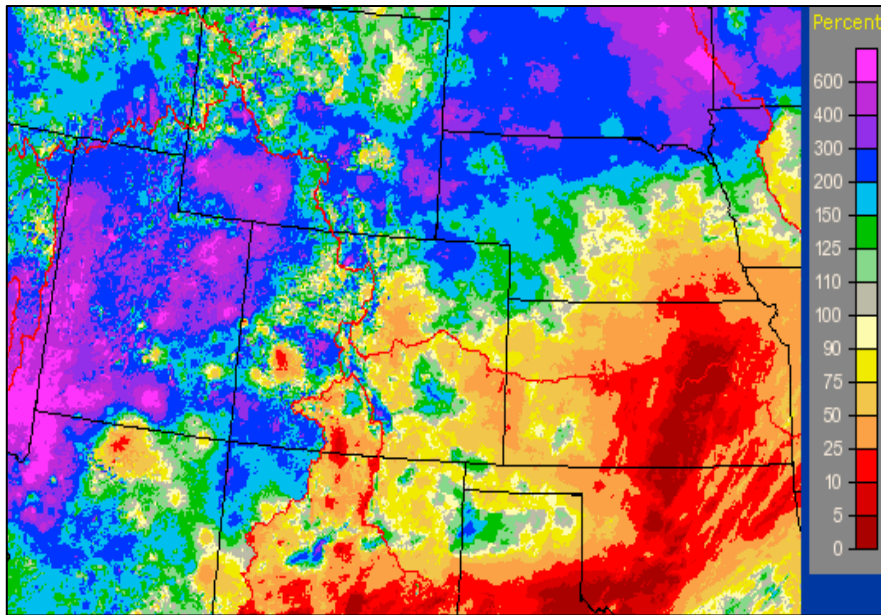


Fig. 1: December precipitation as percent of average.

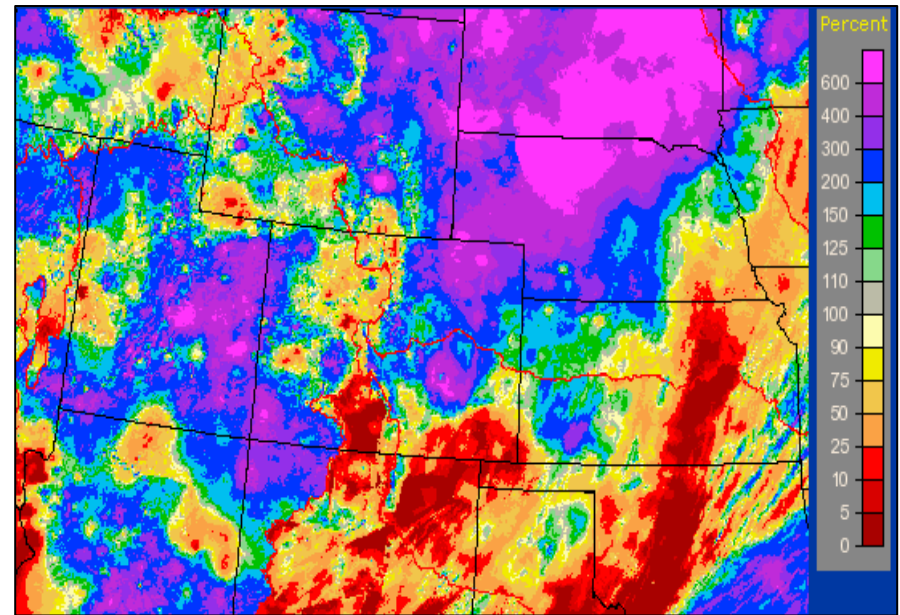


Fig. 2: December 29 – January 4 precipitation as percent of average.

Most of the Upper Colorado River Basin (UCRB) received near or above average precipitation for December, while areas east of the UCRB remained dry (Fig. 1). Southwestern Wyoming has seen over 300% of its average precipitation for the month. Much of northeastern Utah and the northern and central mountains of Colorado also received generous amounts of moisture. Thanks to the last two weeks of the month, the Four Corners region has improved. The Rio Grande and Arkansas basins and parts of the South Platte have remained dry, only receiving around 50% of its monthly average.

Last week, the western part of the UCRB and the Four Corners region received above average precipitation (Fig. 2) with amounts around half an inch to 1.5 inches. The Rio Grande basin and southeast CO again received only very minor amounts for the week. The Colorado headwaters region also was drier than average, only receiving less than a half an inch of moisture in most areas.

Snotel One Week Change in  
Water Year Precipitation as Percentage of Average  
4 January 2011

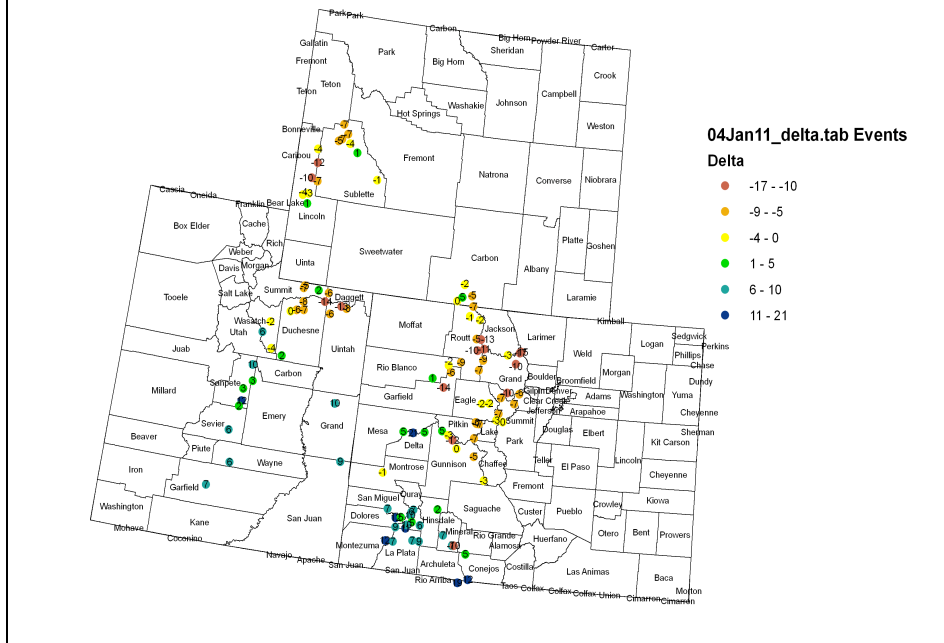


Fig. 3: SNOTEL WYTD one week change in precipitation percent of average.

Snotel Water Year Precipitation Percentile Ranking  
4 January 2011

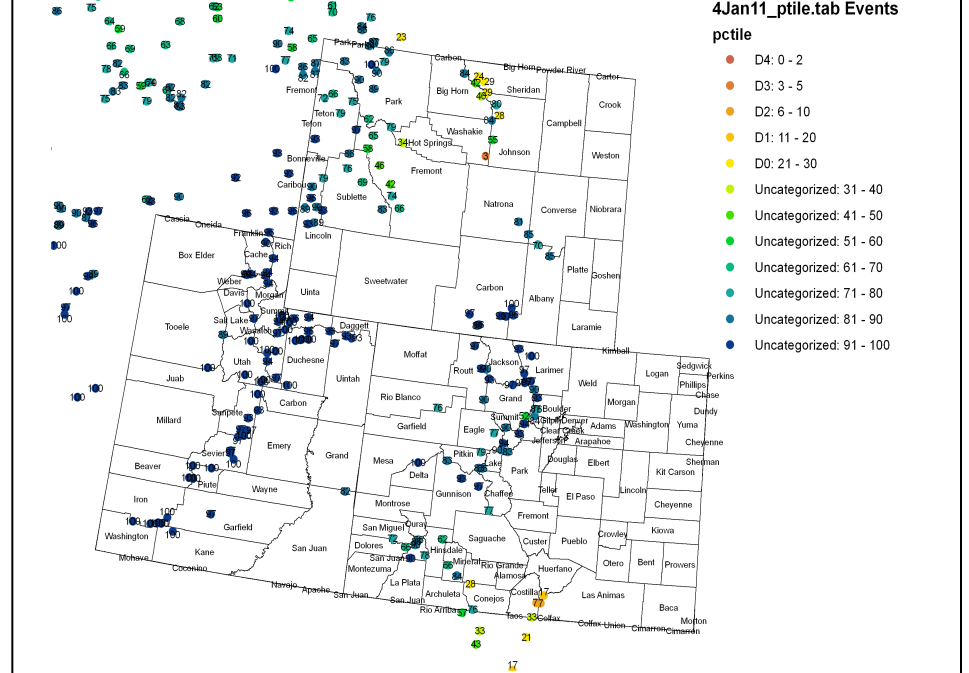


Fig. 4: SNOTEL WYTD precipitation percentiles (50% is median, 21-30% is Drought Monitor's D0 category).

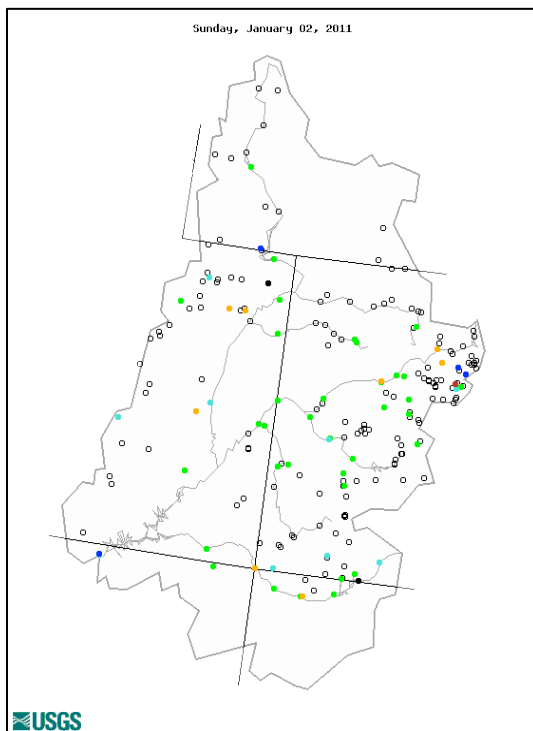
Over the last week, SNOTELs in the northern part of the UCRB saw drops in water-year-to-date (WYTD) precipitation percents of average (Fig. 3). The western border of the UCRB in UT experienced increases in WYTD precipitation percents of average, as did the San Juan basin in southwest CO.

The majority of the SNOTEL sites in the UCRB are showing high percentile rankings for WYTD precipitation (Fig. 4). Most of the western region of the UCRB is near the 100<sup>th</sup> percentile, meaning that very few to no years have been as wet by this time as the current water year. The Rio Grande basin in southern CO is the driest, showing percentile rankings lower than 30%, meaning 70% of the years on record have been wetter. WYTD snowpack for the entire UCRB above Lake Powell is currently at 145% of normal (a slight increase from last week).

# Streamflow

As of January 2<sup>nd</sup>, about 86% of the USGS streamgages in the UCRB recorded normal (25<sup>th</sup> – 75<sup>th</sup> percentile) or above normal 7-day average streamflows (Fig. 5). Although a few stations are showing below normal flows, no gages are recording much below normal flows—however, all the previous 9 years have had some gages with much below normal flows during this time period.

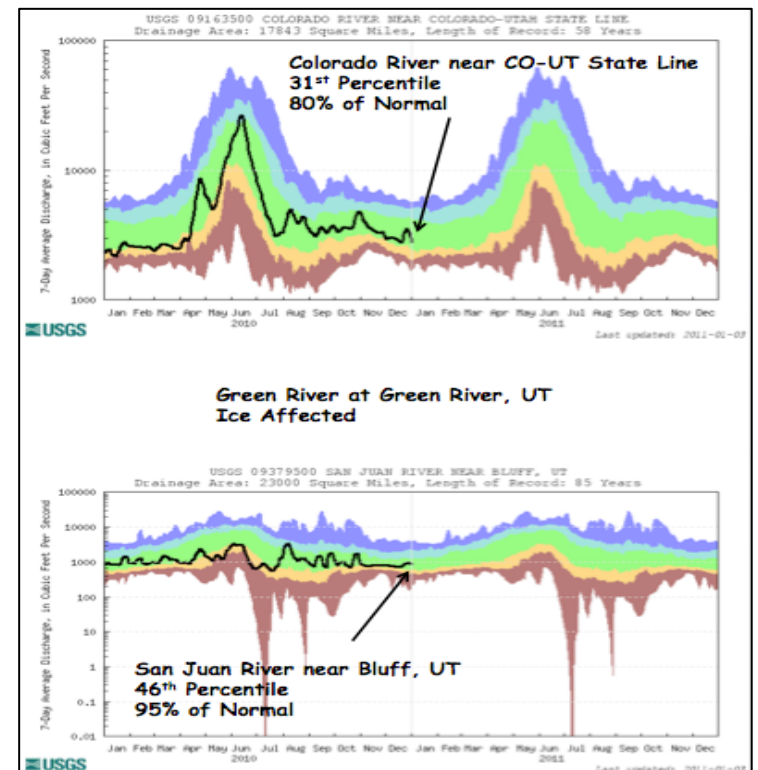
Looking at hydrographs around the UCRB, key sites are showing near normal discharges and are in fair condition in terms of seasonal flow (Fig. 6). 7-day average discharge on the Colorado River at the CO-UT state line and on the San Juan River near Bluff, UT are at 80% and 95% of normal, respectively—both showing lower flows than the last week, likely due to colder temperatures causing freezing upstream. These three gages have shown that total cumulative runoff from the upper basin to the lower basin for the 2010 calendar year was substantially less than the historical average. Cumulative annual runoff on the San Juan River near Bluff, UT was only around 50% of normal.



Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

Fig. 5: USGS 7-day average streamflow compared to historical streamflow for January 2<sup>nd</sup> in the UCRB.

Fig. 6: USGS 7-day average discharge over time at the CO-UT state line (top), Green River, UT (middle) and Bluff, UT (bottom).



# Water Supply and Demand

For the first time in several weeks, temperatures were below average for the UCRB and surrounding areas over the past week. Coldest temperature anomalies were in northeastern UT and southwestern WY, with some areas more than 9°F below average. As a result of precipitation in the past week, soil conditions have improved over southern WY and the Colorado Front Range (Fig. 7). Soil moisture is in good condition in eastern UT and western CO, and very dry soils are still dominant in southeastern CO.

For the month of December, the majority of the reservoirs saw levels drop less than what is normal for this time of year. This includes Lake Powell which saw a volume decrease of 400,000 acre feet; normally Lake Powell sees a nearly 500,000 acre foot volume decrease during this time of year. McPhee Reservoir normally sees levels rising around this time of year, but it is still currently decreasing. Over the past week, many of the reservoirs have seen larger decreases except Lake Dillon which increased levels slightly. Lake Powell released 78,000 acre feet in the past week and is currently at 78% of average and 59% of capacity.

## Precipitation Forecast

A ridge of high pressure is currently developing over the area and will result in mainly dry conditions throughout the UCRB and surrounding areas for the rest of this week. Late in the week, a shortwave trough will begin moving into the area from the southwest. This will bring colder temperatures into the region with increased chances for precipitation in the UCRB for late Saturday and into Sunday. Quantitative Precipitation Fields show the heaviest amounts staying west of the Continental Divide. The northern and central Rockies in Colorado and western Wyoming will likely see around a quarter of an inch of precipitation from this system, with only minor amounts possible in the Four Corners region, northeast UT, and in northeastern CO. The storm will move out of the area by Monday.

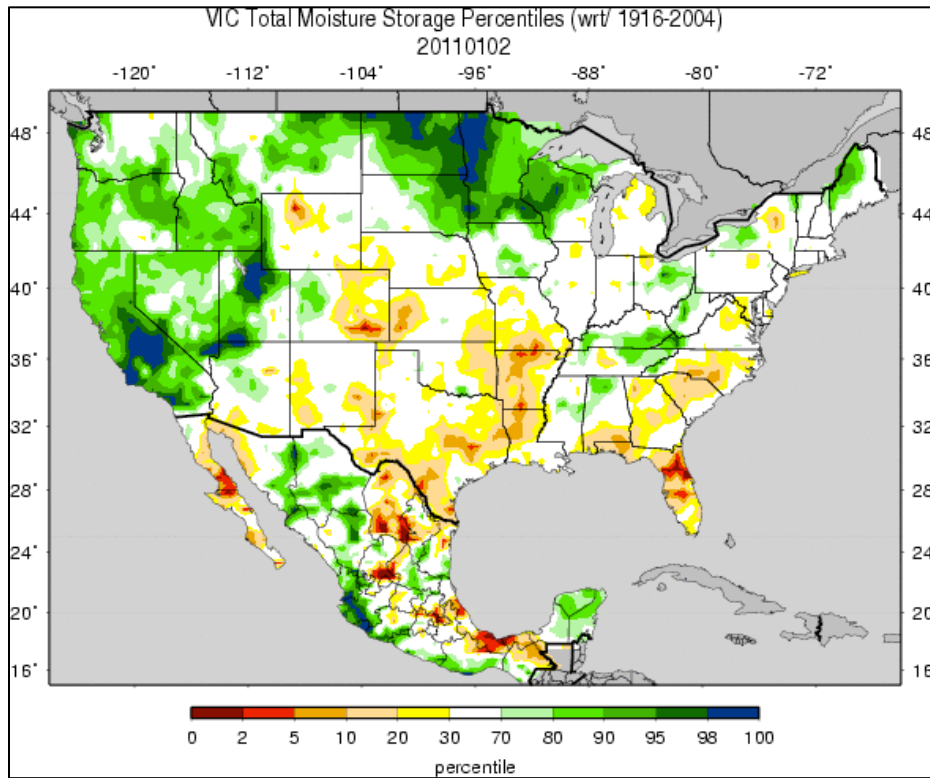


Fig. 7: VIC soil moisture percentiles as of January 2<sup>nd</sup>.

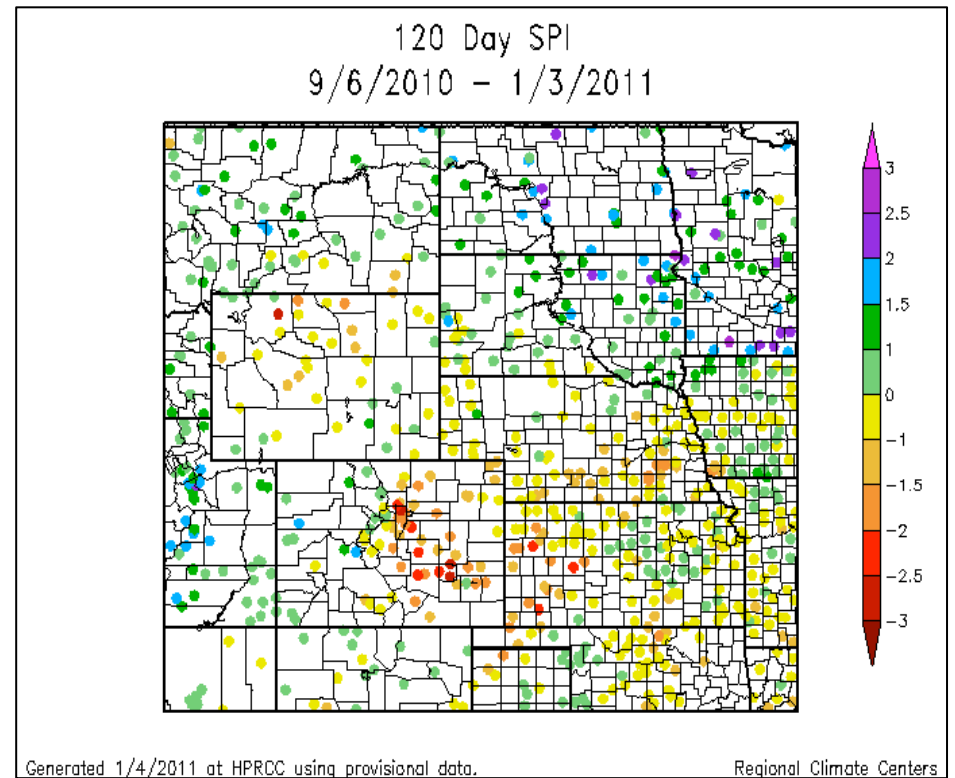


Fig. 8: 120 – day SPI as of January 4<sup>th</sup>.



# Drought and Water Discussion

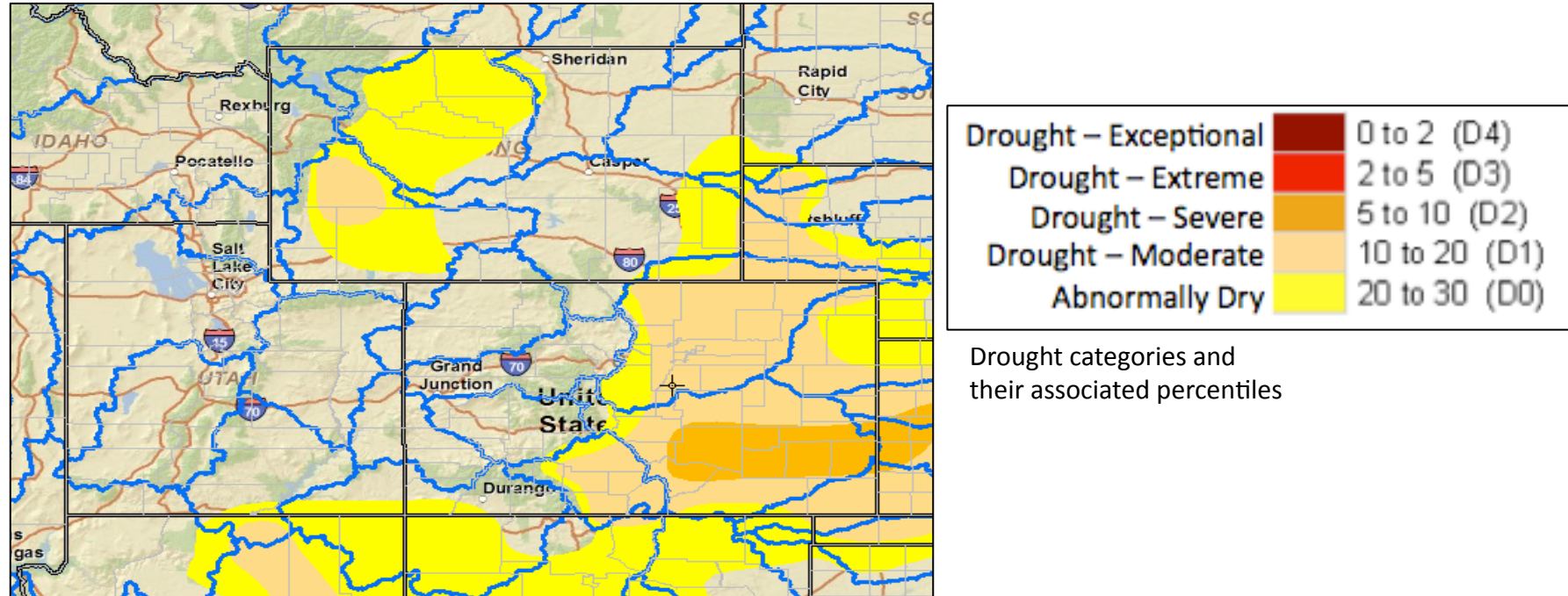


Fig. 9: December 28<sup>th</sup> release of U.S. Drought Monitor for the UCRB

This week's U.S. Drought Monitor (USDM) author has removed D1 from the northern portion of the UCRB in Wyoming in a recent draft of the USDM map (Fig. 9). This was done mostly due to high state snowpack being at 118% of normal and high amounts of precipitation. This area will also be watched closely for possible reductions of D0, pending input from local experts.

As a result of higher than average precipitation for the month of December, it is also being recommended that the D0 in the Four-Corners region be scaled back. Snowpack in the San Juan basin is in excellent condition, streamgages still reporting in the region are mostly showing near normal streamflows, and soil moisture conditions have improved in the area. 120-day SPIs (as well as shorter and longer time scales) now show positive numbers for the region (Fig. 8). It is recommended that D0 be completely removed from southeast UT and southwest CO. Reshaping of lines in NM and AZ should be considered, but we leave those final decisions to their local experts and the USDM author.